UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)
(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
AM9-99-0146

Total Pages in this Submission

TO THE ASSISTANT COMMISSIONER FOR PATENTS
Box Patent Application
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

METHOD AND SYSTEM FOR SELECTIVELY ACCESSING FILES ACCESSIBLE THROUGH A NETWORK

and invented by:

Neelakantan Sundaresan

If a CONTINUATION APPLICATION, *check appropriate box and supply the requisite information:*

☐ **Continuation**   ☐ **Divisional**   ☐ **Continuation-in-part (CIP)**   of prior application No.: _____

Which is a:

☐ **Continuation**   ☐ **Divisional**   ☐ **Continuation-in-part (CIP)**   of prior application No.: _____

Which is a:

☐ **Continuation**   ☐ **Divisional**   ☐ **Continuation-in-part (CIP)**   of prior application No.: _____

Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below

2. ☒ Specification having _____17_____ pages and including the following:

   a. ☒ Descriptive Title of the Invention

   b. ☐ Cross References to Related Applications *(if applicable)*

   c. ☐ Statement Regarding Federally-sponsored Research/Development *(if applicable)*

   d. ☐ Reference to Microfiche Appendix *(if applicable)*

   e. ☒ Background of the Invention

   f. ☒ Brief Summary of the Invention

   g. ☒ Brief Description of the Drawings *(if drawings filed)*

   h. ☒ Detailed Description

   i. ☒ Claim(s) as Classified Below

   j. ☒ Abstract of the Disclosure

P01ULRG/REV04

Application Elements (Continued)

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*

   a. ☐ Formal   Number of Sheets _____

   b. ☒ Informal   Number of Sheets   **3 (Figs. 1-3)**

4. ☒ Oath or Declaration

   a. ☒ Newly executed *(original or copy)*   ☐ Unexecuted

   b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*

   c. ☒ With Power of Attorney   ☐ Without Power of Attorney

   d. ☐ *DELETION OF INVENTOR(S)*
       Signed statement attached deleting inventor(s) named in the prior application,
       see 37 C.F.R. 1.63(d)(2) and 1.33(b).

5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*
   The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. ☐ Computer Program in Microfiche *(Appendix)*

7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*

   a. ☐ Paper Copy

   b. ☐ Computer Readable Copy *(identical to computer copy)*

   c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☒ Assignment Papers *(cover sheet & document(s))*

9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*

10. ☐ English Translation Document *(if applicable)*

11. ☒ Information Disclosure Statement/PTO-1449   ☒ Copies of IDS Citations

12. ☐ Preliminary Amendment

13. ☒ Acknowledgment postcard

14. ☐ Certificate of Mailing

       ☐ First Class   ☐ Express Mail *(Specify Label No.):* _____

P01ULRG/REV04

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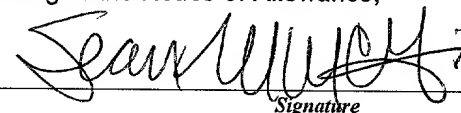## Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*

16. ☐ Additional Enclosures *(please identify below):*

Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	23	- 20 =	3	x $18.00	$54.00
Indep. Claims	4	- 3 =	1	x $78.00	$78.00
Multiple Dependent Claims (check if applicable) ☐					$0.00
				BASIC FEE	$690.00
OTHER FEE *(specify purpose)*		Assignment Recordation			$40.00
				TOTAL FILING FEE	$862.00

☐ A check in the amount of   to cover the filing fee is enclosed.

☒ The Commissioner is hereby authorized to charge and credit Deposit Account No.   09-0441
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- ☒ Charge the amount of $862.00   as filing fee.
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- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Signature

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Registration No. 34,386
Customer No. 21254

Dated: **September 29, 2000**

CC:

     P01ULRG/REV04

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APPLICATION
FOR
UNITED STATES
LETTERS PATENT

APPLICANT:	Neelakantan Sundaresan
FOR:	METHOD AND SYSTEM FOR SELECTIVELY ACCESSING FILES ACCESSIBLE THROUGH A NETWORK
DOCKET NO.:	AM9-99-0146

METHOD AND SYSTEM FOR SELECTIVELY ACCESSING FILES

ACCESSIBLE THROUGH A NETWORK

BACKGROUND OF THE INVENTION

Field of the Invention

5   The present invention generally relates to a method and system for

periodically searching through files accessible through a network, and in

particular, to a method and system for searching through files accessible on a

network during scheduled period searches of files based on data from files

previously accessed.

10   ### *Description of the Related Art*

A network server maintains various files accessible across a network. In

the case of the Internet, the files may comprises hypertext mark-up language

(HTML) data, Common Gateway Interface (CGI) script, image files (e.g., .jpg and

.gif), and Channel Definition Format (CDF) files. Collectively, the files linked

15   through HTML files produce a website, wherein the server acts as the website

host.

       CDFs are small files which include data used by websites' "push" to

specify how often and what parts of the site will be "pushed" (e.g., e-mailed)

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directly to a registered subscriber. Based on the data in the CDF, the website will

e-mail various information to the subscriber.

A typical CDF file is an Extended mark-up language (XML) file. A CDF

file contains various elements referred to as tags. Some tags include CHANNEL,

5   ITEM, USERSCHEDULE, SCHEDULE, LASTMOD, and LEVEL.

The CHANNEL tag has an HREF attribute that specifies the Universal

Resource Locator (URL) on the website that corresponds to that CHANNEL.   For

example:

<CHANNEL HREF= "http://www.mysite.com/Channel/homepage.htm">

10   The SCHEDULE tag indicates when a channel should be updated. For

example:

```
<SCHEDULE STARTDATE= "1999-09-23" STOPDATE = "1997-11-23">
        <INTERVALTIME DAY = "1"/>
        <EARLISTTIME HOUR= "2" />
        <LATESTTIME = "6" />
        </SCHEDULE>
```

15

indicates that the channel should be updated every day between the start

date and the stop date between 2 and 6.

Occasionally, a channel may have a subchannel. A subchannel refers to

20   sub-sites on the website. A subchannel may appear as:

```
<ITEM HREF= "foobar.htm" LASTMOD= "1999-01-01TO0101"
LEVEL= "2">
        <USAGE VALUE= "ScreenSaver"></USAGE>
        </ITEM>
```

A subchannel references a URL with information about when the page was last modified, and from this URL whether the information is relevant.

A conventional search engine accesses websites on the network. The search engine downloads data from the website and archives selected downloaded data. The archived data is linked to the website from which it was downloaded.

One can use the search engine to search for a particular website containing desirable information by entering a query into the search engine. The search engine will search its archived data and return websites in its archived database which relate to the query.

The dynamic nature of the Internet results in websites being updated regularly. Consequently, data which was on the website when the search engine initially visited the website may no longer be there. Alternatively, the data may be outdated. Further, the website may no longer exist or its URL may have changed. As a result, data archived by the search engine could become invalid. In order for the search engine to be a useful tool, the search engine must periodically update its archived data.

A conventional search engine uses a web crawler (e.g., a "robot", "spider", "ant", etc.) to visit (i.e., access) a server on a network. The spider "crawls" from a homepage (i.e., the first or main webpage) of a website to the various subpages linked from the homepage. As the web crawler visits the various homepages with subpages, data on the pages are selectively archived by the search engine.

The typical crawlers visit web sites at regular intervals, for example, every 30 days. If a web crawler accesses a website which has not been updated since the last time the web crawler visited, the web crawler would presume that the data previously archived is still valid. This may be erroneous.

5   That is, one disadvantage with current web crawler technology is that the web crawler does not know when a website is scheduled to be updated. Depending on how often a website is updated, the web crawler's archived data could be very outdated by the time the web crawler returns. On the other hand, frequent web crawler visits to websites not frequently updated consumes valuable

10   computer resources.

SUMMARY OF THE INVENTION

In view of the foregoing and other problems, an object of the present invention is to provide a method (and system) for determining when and how often a web crawler should return to a website.

15   Another object is to provide a method (and system) for using the push channel definition available (e.g., a CDF) or other data on the website to determine how often to visit the website and what parts of the website to crawl based upon the information such as SCHEDULE and ITEM, available from the website. For example, this method can take advantage of a website's "last

updated," SCHEDULE, and ITEM information meant for "push" technology to automatically optimize when and how a web crawler crawls a website.

The invention, in a first aspect thereof, is a method (and system) for searching files stored on a network. A first file is accessed on the network and data is downloaded from the first file. The accessing time to access a second file is set based on the data downloaded from the first file. In a further embodiment, the data from the first file is analyzed to determine when a second file is to be scheduled to be updated and the accessing time is assigned based on when the second file is scheduled to be updated. In an alternate, further embodiment, the method includes selecting a second file to download based on data downloaded from the first file.

The invention, in a second aspect thereof, is a method (and system) for searching through files on an network. The method includes accessing a server on a network and downloading data from a first file. An accessing time to re-access the server is set based on data downloaded from the first file. In a further embodiment, the method includes accessing the server using the accessing time and downloading a second file from the server. In an alternate, further embodiment, the method includes selecting a second file to download based on data downloaded from the first file.

The invention, in a third aspect thereof, is a system comprising a machine readable recording medium storing a program for searching through files accessible on a network. The program includes executable instructions for

accessing a first file on the network and downloading data from the first file. An

accessing time to access a second file is set based on the data downloaded from

the first file. In a further embodiment, the program includes accessing the server

using the accessing time and downloading a second file from the server. In an

5   alternate, further embodiment, the program includes selecting a second file to

download based on data downloaded from the first file.

With the present invention, a website can be "crawled" by using data

previously collected from that website. For example, by using data in a CDF, the

web crawler can be directed to crawl certain areas of the website at various

10   intervals corresponding to when the website is scheduled to e-mail (i.e., "push")

information to its subscribers. As a result, using the present invention, it is likely

that a web crawler will encounter updated information on the website.

Consequently, the present invention provides for a more efficient web crawling of

a website by crawling the site when and where it is likely the information

15   contained therein is updated.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing, and other objects, aspects, and advantages will be better understood from the following detailed description of a preferred embodiment of the invention with reference to the drawings, in which:

5   Fig. 1 is a flow diagram illustrating a preferred method 100 of the invention;

Fig. 2 is a schematic diagram of a system 200 for implementing a method of the present system; and

Fig. 3 is a diagram of a readable recording medium for storing executable

10   instructions.

DETAILED DESCRIPTION OF PREFERRED

EMBODIMENTS OF THE INVENTION

Referring to Fig. 1, method 100 is directed to searching through files stored on a network. Method 100 includes accessing a first file on a network

15   (Step 110).

Data is downloaded from the first file (Step 120). This data is then analyzed (Step 130). If the first file is a CDF, analysis includes identifying various elements such as CHANNEL, SCHEDULE, and ITEM (Step 130). Next, values corresponding to the aforementioned elements are extracted from the

20   downloaded data (Step 130).

An access time to access a second file is set using the SCHEDULE value (Step 140). As such, the access time will be set to correspond to when the web site is scheduled to be "pushed." A second file is selected to be downloaded based on the ITEM value (Step 150). In one embodiment, the second file selected

5   is the same as the first file (Step 150).

Method 100 can be implemented by a web crawler. An example of such an implementation may occur as follows. A web crawler is programmed to visit various websites which may contain CDFs. The web crawler is adapted to use the CDF information as a site map to determine which sub-websites to visit.

10   The first time the web crawler visits the website, the web crawler downloads the CDF file and keeps the site in a database, storing the CHANNEL and SCHEDULE information. Next, the web crawler uses the SCHEDULE information in the CHANNEL tag to decide when to visit the website next.

In one embodiment, the next visit is normalized by the web crawler's own

15   parameters as to when to crawl a site. For instance, if a web crawler has its own schedule and decides to crawl less frequently than the SCHEDULE value, it uses its own schedule than the web site's SCHEDULE value.

When a web crawler visits a website on the web crawler's schedule, the web crawler may selectively visit sub-sites (e.g. items or subchannels) by using

20   the LASTMOD and ITEM tags information in the CDF file to selectively crawl only those subchannels that have been or scheduled to be updated. It also uses the LEVEL attribute in any subchannel to see how deep to crawl.

An advantage of the present method is that using the SCHEDULE and

ITEMS values provides for access only when a website and the website's

associated files are scheduled to be updated. Consequently, a web crawler,

utilizing this method, will access a website when the website is likely to have

5   been updated, based on the CDF data.

Further, the method does not require any work by the website builder (e.g.,

web master) to accommodate the web crawler. The web crawler automatically

uses the "push" information already available.

Referring now to Fig. 2, system 200 illustrates a typical hardware

10   configuration of a processing method 100. Preferably, system 200 has at least one

processor or central processing unit (CPU) 211. The CPUs 211 are

interconnected via a system bus 212 to a random access memory (RAM) 214,

read-only memory (ROM) 216, input/output (I/O) adapter 218 (for connecting

peripheral devices such as disk units 221 and tape drives 240 to the bus 212), user

15   interface adapter 222 (for connecting a keyboard 224, mouse 226, speaker 228,

microphone 232, and/or other user interface device to the bus 212), a

communication adapter 234 for connecting an information handling system to a

data processing network, the Internet, an Intranet, a personal area network (PAN),

or other similar information systems, and a display adapter 236 for connecting the

20   bus 212 to a display device 238. Further, an automated reader/scanner 240 may be

included. Such readers/scanners are commercially available from many sources.

In addition to the hardware/software environment described above, a different aspect of the invention includes a computer-implemented method for performing the above method. As an example, this method may be implemented in the particular environment discussed above.

5   Such a method may be implemented, for example, by operating the CPU 211 (Fig 2), to execute a sequence of machine-readable instructions. These instructions may reside in various types of signal-bearing media.

Thus, this aspect of the present invention is directed to a programmed product, comprising signal-bearing media tangibly embodying a program of

10   machine-readable instructions executable by a digital data processor incorporating the CPU 211 and hardware above, to perform the method of the invention.

This signal-bearing media may include, for example, a RAM contained within the CPU 211, as represented by the fast-access storage for example. Alternatively, the instructions may be contained in another signal-bearing media,

15   such as a magnetic data storage diskette 300 (Fig. 3), directly or indirectly accessible by the CPU 211.

Whether contained in the diskette 300, the computer/CPU 211, or elsewhere, the instructions may be stored on a variety of machine-readable data storage media, such as DASD storage (e.g., a conventional "hard drive" or a RAID

20   array), magnetic tape, electronic read-only memory (e.g., ROM, EPROM, or EEPROM), an optical storage device (e.g. CD-ROM, WORM, DVD, digital optical tape, etc.), paper "punch" cards, or other suitable signal-bearing media

including transmission media such as digital and analog and communication links and wireless. In an illustrative embodiment of the invention, the machine-readable instructions may comprise software object code, compiled from a language such as "C", etc.

5   There are several advantages to the present invention. A major advantage is the invention's ability to "screen" websites. As the number of pages on the web grows (conceivably to well beyond 1 billion), it is impossible for search engines to keep up to date with all of these pages. The present invention provides a method and system which allows search engines to visit the pages that are the most

10   recently updated, and to not visit those web pages that have not been updated.

        Another advantage of the present invention is that it is not limited to CDF files only. It can work with any sitemap structure that a website provides with "change dates." For instance, Netscape uses a different format based on Resource Description Framework (RDF).

15   While the invention has been described in terms of preferred embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the appended claims.

CLAIMS

What is claimed is:

1   1. A method for searching files stored on a network, comprising:

2   accessing a first file on the network;

3   downloading data from the first file; and

4   setting an accessing time to access a second file based on said data

5   downloaded from the first file.

1   2. The method of claim 1, wherein the second file is the same as the first file.

1   3. The method of claim 1, further comprising selecting a second file to download

2   based on said data downloaded from the first file.

1   4. The method of claim 1, wherein the first file comprises a channel definition

2   file (CDF).

1   5. The method of claim 1, wherein said setting an accessing time comprises:

2   analyzing the data from the first file to determine when a second file is

3   scheduled to be updated; and

4   assigning the accessing time based on when the second file is scheduled to

5   be updated.

1   6. The method of claim 3, wherein said setting an accessing time comprises:

2   analyzing the data from the first file to determine when a second file is

3   scheduled to be updated; and

4   assigning the accessing time based on when the second file is scheduled to

5   be updated.

1   7. A method for searching files on a network, comprising:

2   accessing a server on the network;

3   downloading data from a first file; and

4   setting an accessing time to re-access the server based on said data

5   downloaded from the first file.

1   8. The method of claim 7, further comprising:

2   accessing the server using the accessing time; and

3   downloading a second file from the server.

1   9. The method of claim 8, wherein the second file is the same as the first file.

1   10. The method of claim 7, further comprising selecting a second file to

2   download based on said data downloaded from the first file.

1   11. The method of claim 8, further comprising selecting a second file to

2   download based on said data downloaded from the first file.

1   12. The method of claim 7, wherein the first file comprises a channel definition

2   file (CDF).

1   13. The method of claim 7, wherein said setting an accessing time comprises:

2   analyzing the data from the first file to determine when a second file is

3   scheduled to be updated; and

4   assigning the accessing time based on when the second file is scheduled to

5   be updated.

1   14. The method of claim 13, wherein the accessing time is after the scheduled

2   update of the second file.

1   15. The method of claim 8, wherein said setting an accessing time comprises:

2   analyzing the data from the first file to determine when a second file is

3   scheduled to be updated; and

4   assigning the accessing time based on when the second file is scheduled to

5   be updated.

1   16. The method of claim 10, wherein setting an accessing time comprises:

2   analyzing the data from the first file to determine when a second file is

3   scheduled to be updated; and

4   assigning the accessing time based on when the second file is scheduled to

5   be updated.

1   17. A system comprising a machine readable recording medium storing a

2   program for searching through files stored on a network, said program including

3   executable instructions for:

4   accessing a first file on the network; and

5   downloading data from the first file; and

6   setting an accessing time to access a second file based on said data

7   downloaded from the first file.

1   18. The system of claim 17, wherein the second file is the same as the first file.

1   19. The system of claim 17, further comprising selecting a second file to access

2   based on said data downloaded from the first file.

1   20. The system of claim 17, wherein the first file comprises a channel definition

2   file (CDF).

1   21. The system of claim 17, wherein setting an accessing time comprises:

2   analyzing the data from the first file to determine when a second file is

3   scheduled to be updated; and

4   assigning the accessing time based on when the second file is scheduled to

5   be updated.

1   22. The system of claim 19, wherein setting an accessing time comprises:

2   analyzing the data from the first file to determine when a second file is

3   scheduled to be updated; and

4   assigning the accessing time based on when the second file is scheduled to

5   be updated.
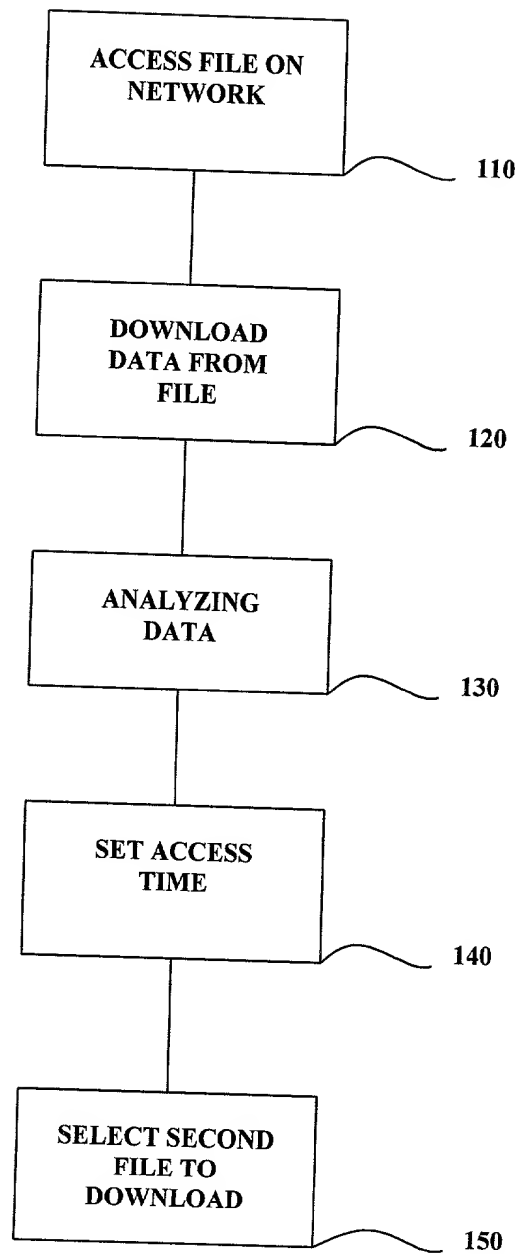

1   23. A system for searching files stored on a network, comprising:

2   means for accessing a first file on the network;

3   means for downloading data from the first file; and

4   means for setting an accessing time to access a second file based on said

5   data downloaded from the first file.

METHOD AND SYSTEM FOR SELECTIVELY ACCESSING FILES

ACCESSIBLE THROUGH A NETWORK

ABSTRACT

A method (and system) for periodically searching through files accessible

5   through a network, at an interval based on previously accessed data. The method

includes accessing and download data from a first file on the network. An

accessing time is set to access a second file on the network based on the data

downloaded from the first file. In one further embodiment, the first file is a
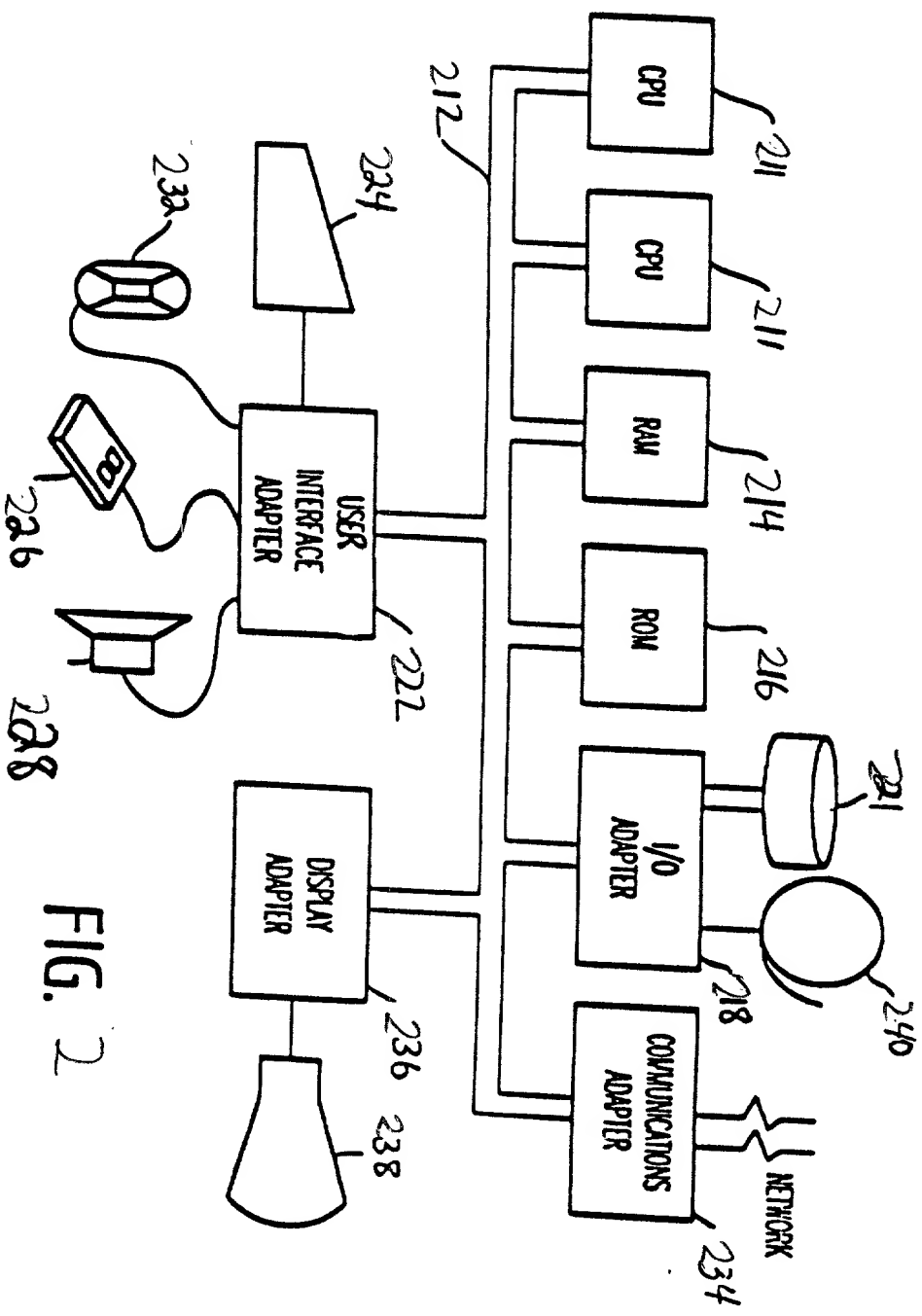
Channel Definition Format (CDF) file.

AM9-99-0146

```
┌─────────────────┐
│  ACCESS FILE ON │
│     NETWORK     │          ～  110
└─────────────────┘
         │
         │
┌─────────────────┐
│    DOWNLOAD     │
│   DATA FROM     │
│     FILE        │          ～  120
└─────────────────┘
         │
         │
┌─────────────────┐
│    ANALYZING    │
│      DATA       │
│                 │          ～  130
└─────────────────┘
         │
         │
┌─────────────────┐
│   SET ACCESS    │
│      TIME       │                        100
│                 │          ～  140
└─────────────────┘
         │
         │
┌─────────────────┐
│  SELECT SECOND  │
│    FILE TO      │
│   DOWNLOAD      │
└─────────────────┘          ～  150
```

Fig. 1

FIG. 2

300
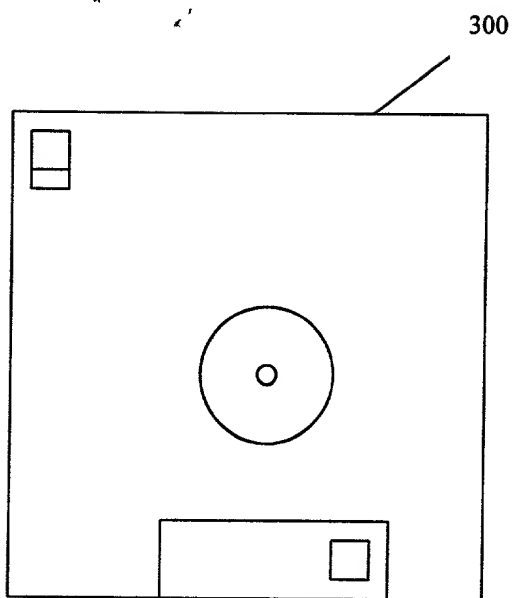
FIGURE 3

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: METHOD AND SYSTEM FOR SELECTIVELY ACCESSING FILES ACCESSIBLE THROUGH A NETWORK

the specification of which:
(check one)

        ⊠ is attached hereto.
        □ was filed on _____, as Application Serial No. _____ and was amended on _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

    Prior Foreign Application(s):

Number	Country	Day/Month/Year	Priority Claimed

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

    Prior U.S. Applications:

Serial No.	Filing Date	Status

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: We hereby appoint Khanh Q. Tran, Registration No. 41,352, Thomas R. Berthold, Registration No. 28,689, Marc McSwain, Registration No. 44,929, Alison D. Mortinger, Registration No. 39,306, and Sean M. McGinn, Registration No. 34, 386, and Frederick W. Gibb, III, Registration No. 37,629 to prosecute this application and transact all business in the United States Patent and Trademark Office connected therewith

Send all correspondence to: **McGinn & Gibb, P.C., 1701 Clarendon Boulevard, Suite 100, Arlington, Virginia 22209. Customer No. 21254**

Telephone calls should be directed to Sean M. McGinn, McGinn & Gibb, P.C. at (703) 294-6699.

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    Signature: _____   Date: September 12, 2000

    Residence: 492 Capital Village Circle, San Jose, CA 95136

    Citizenship: India

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